A CAUSAL RELATIONSHIP BETWEEN OIL PRICES CURRENT ACCOUNT DEFICIT, AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS FROM FRAGILE FIVE COUNTRIES

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Abstract
The main objective of this study is to determine the impact of oil prices in the Fragile-Five countries (Brazil, Indonesia, South Africa, India, and Turkey) on current account deficit and growth. In this study, the method of panel data analysis was used and the period of 1980-2014 was examined. The Levin, Lin, & Chu panel; Im, Pesaran, and Shin W-stat; ADF-Fisher Chi-square; and PP-Fisher Chi-square unit root tests were used to determine the stability of data before panel data analysis. The results of the study can be expressed as follows. i) There was a statistically meaningful relationship in oil prices with both GDP and the current account deficit. While there was a positive correlation between oil prices and GDP, there was a negative relationship between oil prices and current account deficit. ii) No long-term relationship was found between GDP and oil prices; there was a long-term relationship between current account deficit and oil prices as determined by the cointegration tests. iii) Causality test also showed the presence of a bidirectional relationship between GDP and oil prices. Causality between oil prices and the current account deficit was one-way from the variable of oil price to the variable of current account deficit.

Keywords: *Oil Prices, GDP, Current Account Deficit, Fragile Five Countries, Panel Data Analysis*

JEL Classification: *F1, F10, O1, O5, O57*

I. INTRODUCTION

Energy is an indispensable part of life for the reasons of both its use in meeting primary needs such as nutrition and heating and in its intensive transformation as the primary input used in industry resulting from the changes in production processes together with the Industrial Revolution. The increasing prosperity of people due to the diversity and growth in global economic activities continues to increase their energy demands. Whether or not countries have the energy reserves, all of their dependence on energy consumption, as well as the world's limited energy supply, have further increased the importance of a global energy policy.

Many kinds of energy are already used in the world. Fossil fuels such as oil, gas, and coal which cannot be reused constitute non-renewable forms of energy. Renewable forms of energy such as wind, geothermal, solar, wave, and hydrogen are secondary types of energy. Oil is still the most common kind of energy used, even though an increased awareness has primarily focused on the types of renewable energy in the world in recent years. In this study, the impact of increases in oil prices on the current account deficits and economic growth of the Fragile-Five countries (Brazil, Indonesia, India, South Africa, and Turkey) will be tested. Fluctuations in oil prices are an important factor affecting these countries' economies in terms of being a type of energy that is intensively consumed. An increase or decrease in oil prices can affect the production of countries and their final outputs. Aside from this, fluctuations in oil prices may affect the balance of current accounts in different directions in the cases of countries who are energy exporters or importers. The reason for examining this relationship on the Fragile-Five countries is that its importance can be better understood, especially after the two major oil crises in the 1970s, and that these countries are developing countries who have similar economic structures and similar macroeconomic problems such as low growth trends, high inflation, and high current account deficits.

II. THE FRAGILE FIVE: A NEW ACRONYM

A statement made by the US regarding the reduction of asset purchases in May of 2013 has been interpreted as a diminishing abundance of global funds by the international markets. Some emerging economies that can easily find cheap and long-term funding have achieved significant economic growth rates during the periods of abundant global liquidity. However, the end of the spring semester in global liquidity means that it has become difficult to find funds from international markets and borrowing costs have increased. Faced with this situation, the currencies of some emerging market economies have begun to depreciate against the dollar.

A report prepared by Morgan Stanley at the beginning of August 2013 stated that the currencies of emerging market economies such as Turkey, Brazil, Indonesia, India, and South Africa had entered a fragile structure by the influence of FED policy (the US Central Bank), and therefore these countries had been called the Fragile Five. In this report, it was expressed that these five countries had adverse conditions such as low economic growth potential, high current account deficits, and high inflation; they had taken on a competitive structure of international capital flows with a high dependence on foreign investment in order to finance the continuity of economic growth which weakened these countries' national currencies against the dollar.(Lord, 2013, p. 15)

The term Fragile Five emerged with the recovery process that began after 2011 in developed countries affected by the global economic crisis that had occurred in 2008. Foreign capital chose emerging country economies that could manage to remain strong as opposed to developed countries because of the revealed uncertainty and economic deficiencies of developed countries after the 2008 crisis. Then the situation reversed with the advancements experienced in developed countries and foreign capital again began to prefer more developed countries.(Kuepper, 2014) Weakening occurred with currencies of the Fragile Five countries through a reduction in asset purchases by the US Central Bank. In 2014, the Brazilian Real lost 14% of its value; the Indian Rupee, 14%; the Indonesian Rupee, 21%; the Turkish Lira, 24%; and the South African Rand, 19% against the dollar by comparison to the previous year.(Badkar, 2014) The Fragile- Five countries chose the path of raising interest rates by applying an interest rate policy in order to compensate for the weakening experienced in their national currencies and for financing high current account deficits. The Brazilian Central Bank increased the interest rate, which had been 7.25% in June 2013, in stages up to 11.25% as of October 2014.(Banco Central De Brasil, 2015) Bank Indonesia increased their interest rate, which had been 6% in June 2013, to 7.75% in November 2014.(Bank Sentral Republik Indonesia, 2015) South Africa Central Bank raised their interest rates from 5.5% to 5.75% through its monetary policy decision (Trading Economics, 2015). The direction of interest rates in Turkey was the same; the interest rate was 4.5% in May 2013, increased to 10% by January 2014 as a result of various political instabilities, and gradually dropping down to 8.25%.(TCMB, 2015) However, these interventions were made, they have led to limited results against the weakening exchange rate. The current account deficit problem, which is connected to exchange rate volatility in the Fragile Five countries, and the instability experienced in economic growth are some of the common problems that caused these countries to be reported as a group.

Table 1: Some Macroeconomic Data from the Fragile Five Countries

Country	Unit	2008	2009	2010	2011	2012	2013	2014
Brazil	**Economic Growth (%)**	5.17	-0.33	7.53	2.73	1.03	2.49	0.30
Indonesia		6.01	4.63	6.22	6.49	6.26	5.78	5.16
India		3.89	8.48	10.26	6.64	4.74	5.02	5.63
S. Africa		3.62	-1.53	3.14	3.6	2.47	1.89	1.4
Turkey		0.66	-4.83	9.16	8.77	2.13	4.05	3.03
Brazil	**Per Capita GDP ($)**	8,633	8,332	10,961	12,536	11,281	11,172	11,067
Indonesia		2,209	2,918	2,984	3,508	3,590	3,509.82	3,404
India		1,052	1,158	1,430	1,552	1,514	1,509	1,625
S. Africa		5,517	5,682	7,174	7,839	7,314	6,621	6,354
Turkey		10,276	8,527	10,020	10,476	10,530	10,721	10,518
Brazil	**Inflation (%)**	5.67	4.88	5.03	6.63	5.40	6.20	6.28
Indonesia		9.77	5.04	5.14	5.34	3.98	6.41	5.98
India		9.19	10.61	9.49	9.47	10.21	9.48	7.82
S. Africa		11.53	7.13	4.25	5.00	5.65	5.75	6.30
Turkey		10.44	6.25	8.56	6.47	8.89	7.49	9.04
Brazil	**Current Account Balance (Billion $)**	-28.19	-24.30	-47.72	-52.47	-54.25	-81.07	-79.63
Indonesia		0.12	10.62	5.22	1.75	-24.37	-29.1	-27.63
India		-27.91	-38.18	-45.94	-78.15	-88.16	-32.39	-42.54
S. Africa		-19.61	-11.50	-7.18	-9.38	-20.04	-20.43	-19.57
Turkey		-40.37	-12.12	-45.42	-75.08	-48.49	-65.11	-47.55
Brazil		-1.70	-1.49	-2.20	-2.21	-2.41	-3.61	-3.54

Indonesia	**Current Account Balance (GDP %)**	0.02	1.97	0.73	0.21	-2.77	-3.34	-3.22
India		-2.28	-2.79	-2.69	-4.15	-4.74	-1.72	-2.07
S. Africa		-7.17	-4.03	-1.97	-2.32	-5.24	-5.82	-5.73
Turkey		-5.52	-1.97	-6.21	-9.69	-6.15	-7.94	-5.84

Source: *Organized from IMF data (2014).*

Further macroeconomic similarities the Fragile Five countries have are also noted in addition to the loss of value experienced in their currencies. These similarities can be shown as a slowdown in economic growth, high inflation, and high current account deficits. Some macroeconomic indicators of the Fragile Five are given in Table 1. When considering the economic growth rate, while there had been stable and rapid growth up until 2011, a serious slowdown in growth figures was noted by 2012. Growth, especially in Brazil and South Africa, had almost stopped. When considering the figures of average national income per capita, it is seen that the other four countries apart from India are in the upper-middle income level, and Brazil and Turkey have exceeded $10,000 in terms of per capita income. Inflation figures indicate that the price movements have created problems in all countries at various levels. Brazil's inflation data is seen to follow the most stable trend over the years. There have been noticeable declines in Indonesia, India, and South Africa's inflation rates from 2008 to 2014. The most serious difficulties with inflation have been experienced in Turkey. The inflation rate, which had been reduced to a single digit in 2009, was forced back to double-digits in 2014. There is a negative current account balance in all of these countries. Turkey is still the country most at risk on the issue of current account balance.

Table 2: Total Oil Production and Consumption (in millions of tons) of Fragile Five Countries

		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Brazil	**Prod.**	98.9	105.8	111.4	114.1	112.1	109.8	122.1
	Cons.	109.1	109.9	119.4	125.0	127.5	135.2	142.5
Indonesia	**Prod.**	49.4	48.4	48.6	46.3	44.6	42.7	41.2
	Cons.	60.4	61.6	66.9	72.0	73.2	73.1	73.9
India	**Prod.**	37.8	38.0	41.3	42.9	42.5	42.5	41.9
	Cons.	144.7	152.6	155.4	163.0	173.6	175.3	180.7
South Africa	**Prod.**	-	-	-	-	-	-	
	Cons.	25.7	24.2	26.6	27.7	28.0	27.8	29.1
Turkey	**Prod.**	-	-	-	-	-	-	
	Cons.	32.1	32.5	31.8	31.1	31.6	33.6	33.8

Source: BP, "Statistical Review of World Energy 2015", 2015, p. 10–11 http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html, Erişim Tarihi (01/10/2016).

When considering the outlines of the Fragile Five's energy policies, Brazil seems to be in a comfortable position regarding their dependency on hydrocarbon fuels such as oil, gas, and coal because of the important contribution they gain from renewable energy sources. Brazil's hydrocarbon consumption, of which oil makes up 37%, comprises 53% of their total consumption; 45% of their energy comes from renewable energy sources and 2% from nuclear energy. Brazil achieved a growth in their energy reserves due to an increase in hydroelectric production, the discovery of oil reserves in the continental shelf, and energy generated from sugar cane, which meets 16% of their total energy consumption. Brazil is expected to be among the major oil exporters in the future with a potential daily production estimate of 2 million barrels as a result of the significant work that Petrobras, a state-funded oil company, has carried out.(Goldemberg, 2012, pp. 11–13)

Indonesia is positioned as a net exporter in the global energy market with its oil, natural gas, and biofuel exports. This situation positions Indonesia, with the exception of oil and oil derivatives, as an energy-independent country. Yet it has become an importer with a dependency in particular on oil energy due to its aging refinery plants and decreasing reserves. High living standards obtained from the high economic growth of recent years have brought an increase in energy demand. Therefore, Indonesia has been developing policies such as infrastructure investments, energy market regulations, and various institutional arrangements to ensure the security of their energy supply.(IEA, 2015, pp. 9–10)

South Africa is rich in energy resources. As it is especially abundant, coal meets 70% of the country's primary energy production needs. It accounts for 93% of the electricity used in the country. In addition, 33% of extracted coal is exported. Oil constitutes 38% of the total final energy consumed in the country. A majority of the consumed oil is met through imports. Natural gas consumption in South Africa is limited to 2% of total energy consumption. The country's energy policy had been generally concentrated on energy security until the

Apartheid regime (1948-1994). Policies have been developed to counter the unjust distribution of energy resources in the country with the transition to democracy between 1994 and 2000. After the new millennium, the energy policy was greatly used to support socio-economic developments such as giving importance to local and global environmental concerns, supporting economic security, and creating new jobs (Davidson, 2006, pp. 4–6).

India is one of the world's major energy consumers with their high and growing energy demand, inadequate resources, and large population. India's demand for oil has increased with the high growth rate it gained in recent years. This has increased the importance of creating an effective energy policy in India. India's energy policy is built on three pillars. These can be listed as *energy accessibility, energy supply security,* and the *struggle against climate change*. The basic policies for achieving these three objectives have been identified as *self-reliance, non-intervention,* and *inclusive development* (Ahn & Graczyk, 2012, p. 17), Erişim Tarihi (09/28/2015). India's management activated a multidimensional energy policy in 2008 that consists of energy security, energy access, power of energy financing, pricing, energy efficiency, and environmental issues in order to reach these objectives (Ahn & Graczyk, 2012, p. 21). Aside from this, steps such as increasing the share of renewable energy sources within total energy consumption and discovering shale gas and oil production sites have been taken in order to reduce the growing energy dependency on the energy sector as a whole, particularly with oil use (DGH, 2012, p. 1).

Turkey is a country that is dependent on around 70% of its energy, even though it is positioned next to a significant portion of the global energy reserves. This situation weakens the security of the energy supply in this country. Turkey shapes their energy policies by ensuring a secure supply and benefiting from the advantages of its geopolitical location. As is known, Turkey is a natural land bridge between Europe, the largest energy market, and the Middle East, Caucasus, and Caspian Basin, where the world's most important energy reserves are. It attempts to use this advantage to improve energy transportation projects that will bring together producer and consumer countries in the region, thus ensuring its energy security. These policies became more pronounced after the accession process to the European Union.(Yıldız, 2011, pp. 276–277)

The Fragile-Five countries exhibit similar macroeconomic performances with each other. Brazil has achieved high rates of economic growth overall during the global crisis despite the recession it has fallen into for the last two years. However, high growth has led to the emergence of over 5% inflation. Economic expansion along with inflation has caused their current account deficit. Turkey, South Africa, and Brazil are at a greater disadvantage from both fluctuations in politics and exchange rate losses compared to India and Indonesia. The elected governments in India and Indonesia have taken important steps towards deciding to reform both their fiscal balance and debt structure. The appearance of political turmoil has increased the risks in Turkey; this has increased the pressure on the Turkish Lira. Similarly, allegations of corruption that re-elected Dilma Rousseff faced in Brazil led the economy to drift toward recession and the Real to lose value. Similar political events have taken place in South Africa. The country's economic outlook was adversely affected when President Zuma replaced the finance minister three times in one week, which was followed by a rapid decline in the Rand. If one observes India and Indonesia to have followed a more positive trend compared to the other three countries, their current account deficits and need to depend on foreign oil also continue. Oil prices and relations between current account deficit and growth for the Fragile-Five countries will be discussed in this study through their dependence on a growing economy and increased oil consumption due to domestic demand.

III. LITERATURE REVIEW

After the crises of the 1970s, economist-directed relationships between oil prices and economic activity became relevant and literature was developed to include different periods, countries, and groups. One of the pioneering studies on this subject was Darby's study that examined the impact of oil prices on inflation and recession using the Barron-Lucas real income equation. The study, which addressed America, Britain, Canada, France, Germany, Italy, Japan, and the Netherlands, achieved the result that changes in oil prices caused marked and statistically significant effects on inflation and recession. In the examined period of 1973-1974, the unavailability of price controls was shown to be result of this situation. In the study, oil prices were concluded to have no impact on US economy.(Darby, 1982)

The negative impact of oil prices on GDP was concluded in Hamilton's study on the US economy over the years 1949-1972. In this study, Hamilton stated that changes in oil prices changed the GDP as an exogenous variable of oil prices by using Granger's causality test; he revealed all price changes do not have the same impact on the economy and that reductions in oil prices also unexpectedly lowered economic output just like increases do.(Hamilton, 1983)

Another study conducted on the American economy in 1986 tested the accuracy of three popular ideas which were thought to prove that economic indicators were linked to the energy crisis. These ideas were that oil shock usually affects the economy in the form of inflationary costs, that the impact of crude oil prices on the economy differed before and after 1973, and that oil prices were determined in different ways before and after 1973. Results showed that the first two opinions regarding the American economy were not correct and that the third opinion had limited accuracy. On the contrary, it claimed a balanced relationship between oil prices and the US economy.(Gisser & Goodwin, 1986)

Mork, Olsen, and Mysen (1994) examined the effect of increases and decreases in oil prices on GDP in their study performed on the USA, Canada, Japan, West Germany, France, England, and Norway. Increases in oil prices were observed to produce a significant and negative impact in these countries except for Norway. Norway's oil industry was declared as an important part of their total economy in order to reveal these results. Decreases in oil prices were concluded to have a more pronounced, positive effect in the United States and Canada.(Mork, Olsen, & Mysen, 1994)

Papapetrou published a study that had tested the relationship of Greece's economic oil prices with real stock prices, interest rates, real economic activity, and employment. It analyzed the period between January 1989 and June 1999 using the method of multivariate vector autoregression (ZVAR) via monthly data related to work. As a result of these observations, the results were obtained that oil prices affect economic activity and employment and that stock prices were a significant variable.(Papapetrou, 2001)

In another study, Papapetrou also examined the relationship between Greek economy's manufacturing industry and oil prices using monthly data from January 1982 to August 2008. The regime transition model (RS-S) and the threshold value model (TA-R) were used in this study. The asymmetric effect of oil prices on economic activity in Greece was obtained as a result of the analysis. Oil prices were more significantly described as adversely affecting economic activities when showing an increase of 3% month by month or a change in price of over 2.7% .(Papapetrou, 2009)

A study that examined the impact of oil prices on the current account balance of Turkey was conducted by Özlale and Pekkurnaz. The structural vector autoregression model was used in this study. The current account deficit was seen to increase in the first three months after an increase in oil prices and to begin to decrease in the subsequent period; oil prices had a short-term effect on the current account deficit.(Özlale & Pekkurnaz, 2010)

The impact of oil price shocks on Turkey's economy was discussed through the general equilibrium model developed by Aydın and Acar, and it identified that these shocks have a significant impact on macro-indicators and CO_2 emissions.(Aydın & Acar, 2011)

In a study on the impact of oil prices on Turkey's current account deficit which had been performed on the period from January 1992 to February 2013 using monthly data through the Johansen cointegration test and Granger causality test, these two variables were observed to have a long-term relation with each other.(Mucuk, Gerçeker, & Ay, 2013)

According to results of the study from Cheng that examined Brazil, Mexico, and Venezuela, while causality between energy consumption and economic growth did not occur in Mexico and Venezuela, a significant relationship between energy consumption and growth did emerge in Brazil.(Cheng, 1997)

Asafu-Adjaye examined whether or not there had been a causal relationship between energy consumption and income growth in Indonesia, India, the Philippines, and Thailand in his study from 2000. The results of the study revealed that there had been a one-way relationship from energy to income growth in India and Indonesia, and a bidirectional relationship in the Philippines and Thailand (Asafu-Adjaye, 2000).

Yoo and Kim (2005) examined the relationship between electricity production and economic growth using a time series method based on annual data from Indonesia between 1971 and 2002. According to the results achieved, a one-way relationship emerged from economic growth to the generation of electricity (Yoo & Kim, 2006).

In a study performed by Gupta and Modise (2013) for the years 1973-2011, the relationship between South African stock prices and oil-price shocks was discussed. This time period was examined using the causality relationship; it concluded that oil-price shocks had led to different effects, and the source of global economic developments and shocks had different consequences on stocks (Gupta & Modise, 2013).

The relationship between consumption of electricity and economic growth was examined in another study conducted for South Africa in 2009. In this study, the result emerged that a very specific and two-way relationship between economic growth and energy consumption emerged as well as that employment was closely linked with economic growth (Odhiambo, 2009).

The impacts of energy demand on the economy have been discussed in several studies in the literature. As a result, these studies which had been conducted on countries and groups of countries for various periods of time reached different and sometimes conflicting results (Ozturk, 2010, p. 340). The relationship between energy consumption and growth took the lead in this respect. On the other hand, studies on oil price have also had an important place. Many studies examining the effects of oil prices on GDP and inflation have been conducted. The relationship between current account deficit and movements in oil prices have been examined in addition to economic growth and inflation. This study will present the impacts of oil prices on growth and current account deficit for the Fragile-Five country group in light of the mentioned literature. The analysis of the relationship of oil prices with these countries' growth and current account deficits which have been highlighted through their economic growth, albeit quite fragile after the global crisis of 2008, is intended to contribute to the literature.

IV. The Effects of Changes in Oil Prices on Current Account Deficit and Growth: An Empirical Study on the Fragile-Five Countries

Method

In this research, the primary discussion of the period of time from 1980-2014 in the Fragile Five countries (Brazil, India, Indonesia, South Africa, Turkey) has been subjected to panel data analysis using annual data; the effects of oil prices on economic growth (GDP) and current account deficit have been investigated. Before analyzing the panel data model, the structure stability of series was analyzed using the Levin, Lin & Chu; Im, Pesaran, Shin W-stat; ADF-Fisher Chi-square; and PP Fisher Chi-square tests from among the panel unit root tests.

Panel Unit Root Tests

The Levin, Lin, and Chu (LLC) test argues that with highly persistent deviations from the equilibrium, individual unit root tests have limited performance against alternative hypotheses (Levin, Lin, & James Chu, 2002, p. 2). This case is more noticeable in small-sized samples. The LLC test proposes a panel unit root test instead of a separate unit root test for each section. While the null hypothesis is that each individual time series contains a unit root, the alternative hypothesis is that each time series is static. The LLC proposes a three-stage process in its implementation phase. The first of these steps is to perform separately the augmented Dickey-Fuller test (ADF) for each section. The second step is the estimation of short and long-term standard deviations. The last step in the process is to calculate the panel test statistics (Baltagi, 2005, p. 240).

The Im, Pesaran, and Shin W-stat test (IPS) is a method that suggests the existence of a unit root that relates information in a time-series dimension to information from the horizontal cross-sectional dimension (Hassan, Bakar, & Abdullah, 2014, p. 7). The IPS foresees an alternative test procedure depending on the average statistics from the unit root test. In particular, a test procedure is defined by depending on the separately calculated average statistics for each group in the panel data from the Dickey-Fuller test. This test process has been given the name *T-bar test process*. T-bar test statistics give strong results even in a small number of observations of time and sections (Im, Pesaran, & Shin, 2003, p. 54). In the IPS test, while each series in each panel contains a unit root according to the null hypothesis, the alternative hypothesis states that some individual series also may include the unit root (Baltagi, 2005, p. 243).

The ADF Fisher test was developed by Madalla and Wu (1999) as based on Fisher (1932). The ADF Fisher chi-square test basically combines the p-values of the test statistics that were calculated for each unit root in each remnant horizontal section. The ADF Fisher Chi-square test is a non-parametric test and can be calculated for a random selection of the unit root test. The test has a chi-square distribution with *2N* degrees of freedom. An important advantage of the ADF Fisher chi-square test is also that the null hypothesis can be used regardless of its integration or stability (Narayan, 2003, p. 12). When the *p*-value approaches 0 (rejection of the null hypothesis), *ln*(*p*) approaches infinity and large values of *p* are found. The null hypothesis, which claims the existence of panel unit roots, is rejected. Conversely, when the *p*-value approaches 1 (null hypothesis is not rejected), *ln*(*p*) approaches 0 and hence small values for *p* are found. The null hypothesis which claims the existence of panel unit roots is now not rejected (Chen, 2013, p. 7).

The Phillips-Perron Fisher chi-square test (PP-Fisher), like the ADF Fisher test, was also developed from the original Dickey-Fuller test equation. In this test, the Dickey-Fuller test statistic has been semi-parametrically modified based on the idea that serial correlation does not affect asymptotic distribution. The PP-Fisher test uses a method that investigates the existence of a unit root within the singular time series. However, this test has limited influence against the near unit-root alternatives in finite samples (Dritsak & Dritsaki, 2013, p. 39).

Panel Data Analysis

Series whose stabile structures have been determined through unit analysis are subjected to panel data analysis using the "Pooled Least Squares" method. Time-series for a variety of data from each country occurred in the panel data analysis. While the horizontal cross-section data gave information related to various data for only a period of time from different countries, time-series gives information according to a period of time for only one country. This method allows the estimation of economic relations by using data that has a horizontal cross-sectional dimension.

Panel data analysis analyzes consecutive units of a given sample at a time. Thus, the ability to make multiple observations is provided for each set of data in the sample. According to the panel data analysis, individuals, companies, countries, and so on are heterogeneous. Time series or cross-sectional analysis is insufficient at controlling this heterogeneity. However, this adverse situation can be removed with panel data. Panel data analysis is a method that is more informative, more flexible, less collinear between variables, and more effective with a higher degree of freedom according to time series and cross-sectional analysis. Panel data is more favorable for defining and measuring effects that are difficult to identify. More complex behavioral models in comparison with horizontal cross-sections and time series models may be established and tested using panel data models. Panel data has some disadvantages that make studying difficult aside from the advantages mentioned above. These include problems that may arise in data collection, disturbances in measurement errors, and selection problems (Baltagi, 2005, pp. 4–8).

Fixed- and random-effects estimators are often used in static models that estimate by using panel data sets. The difference between each horizontal section in the panel (country) is obtained by separately adding the constants for each horizontal section in the fixed-effect estimation method. However, the characteristics of a

horizontal section cannot be observed using random-effects estimation methods, and these random effects can be obtained from the error terms as they have been scattered at random. In this study, the Hausman test was used in determining whether the fixed effect or random effect model would be valid. The probability ratio, developed as an alternative to Pearson's chi-square test, is based on the maximum probability theory. What is applied in this test is that the classical model is tested against the random effects model. If the H_0 hypothesis is accepted, the fixed effect model is considered to be correct. When calculating the probability ratio, the fixed-effect and random-effects models are tested and estimated using the maximum probability method (Tatoğlu-Yerdelen, 2013, p. 168). The Hausman test is based on the basic idea that the difference between two consistent estimators approaches zero. When one of the estimators Φ_1 is consistent under the accurately identified null hypothesis, it will be inconsistent under the alternative hypothesis. The other estimator Φ_2 is consistent under both the null and alternative hypotheses. In the case of an incorrect identification of the alternative hypotheses, Φ_1 is no longer consistent, but Φ_2 still maintains its consistency. In this case, the difference between Φ_1 and Φ_2 is a non-zero probability, and test statistics will eventually result in the rejection of a null hypothesis accurately identified in such a case (Creel, 2003, p. 2).

Panel Cointegration Test

In this study, the Kao residual cointegration test was used from among the panel cointegration tests. Kao has described two different test types in cases where the null hypothesis does not cointegrate with the panel data, the DF and ADF tests. Kao proposed four types of DF and one type of ADF test statistics. While the first two DF-type statistics are based on the assumption of the rigid externality of the rectifier according to errors in the equation, the other two DF-type statistics allow for endogenous regressors (Hoang, 2010, p. 5).

The Kao test exhibits two sets of specifications for the augmented Dickey Fuller Test type. In the case of two variables, Kao considered the following model (Kao, 1999, p. 9):

$$y_{it} = \alpha_{it} + \beta x_{it} + e_{it} \qquad \text{i=1,2,....N, t=1,2,....T} \qquad (1)$$

where

$$y_{it} = y_{it-1} + u_{it} \qquad x_{it} = x_{it-1} + \varepsilon_{it} \qquad (2)$$

α_{it} is the fixed effects that vary through the horizontal-section observations, β is slope parameter, y_{it} and x_{it} are independent of each other, randomized for each i. As a remnants series, e_{it} must be i(1). Estimated remnants for the augmented Dickey-Fuller test are as follows:

$$\hat{e}_{it} = p\hat{e}_{it-1} + \sum_{j=1}^{p} \varphi_j \Delta \hat{e}_{it-j} + V_{itp} \qquad (3)$$

The augmented Dickey-Fuller test is as follows for a null hypothesis with no cointegration:

$$t_{ADF} = \frac{(\rho-1)[\sum_{i=1}^{N}(e_i^1 Q_i e_i)]^{\frac{1}{2}}}{s_v} \qquad (4)$$

Kao suggested the following statistics for the next step:

$$ADF = \frac{t_{ADF}+\sqrt{6N}\sigma_v/(2\sigma_{0v})}{\sqrt{\sigma_{0v}^2/(2\sigma_v^2)+3\sigma_v^2/(10\sigma_{0v}^2)}} \sim N(0,1) \qquad (5)$$

Panel Causality Test

The pairwise Granger causality test was used in this study from among the panel causality tests. The pairwise Granger causality test proposes an approach based on time series to express causality. In the Granger causality approach, if *x* is necessary to make a future estimate about *y*, then *x* is a cause of *y*. From this viewpoint, the concept of "requirement" indicates that *x* is helpful for increasing the precision of future estimates of *y* using only its past values (Foresti, 2006, p. 3). Two variables are usually analyzed together in the Granger causality test. Four possibilities are likely to emerge from the test. While the first possibility is the emergence of a unidirectional causality from *y* towards *x*, the second possibility is the emergence of a unidirectional causality from *x* towards *y*. A third possible outcome is the presence of two-way causality between *x* and *y*. The last possibility is the lack of any causality between *x* and *y* (Awe, 2012, p. 7).

When given two time series, X_t and Y_t, if Y_t can be better predicted using past values of X_t and Y_t rather than its own past values alone, X_tY_t is said to be a Granger cause. Selected economic pointers are modeled by using pairwise Granger causality analysis as proposed by Granger (1969).

$$X_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} X_{t-i} + \sum_{i=1}^{n} \alpha_{2i} X_{t-i} + u_t \qquad (6)$$

$$Y_t = b_0 + \sum_{i=1}^{q} b_{1i} Y_{t-i} + \sum_{i=1}^{r} b_{2i} X_{t-i} + v_t \qquad (7)$$

u_t and v_t are unrelated, random disruptive parameters that must average zero. The variables *m*, *n*, *q*, and *r*, being hysteresis numbers, are obtained from the criteria of the Schwarz Bayesian (SBC) and/or the log-likelihood ratio (LR) test(s).

$H_0 : \alpha_{21} = \alpha_{22} = \ldots\ldots\alpha_{2n} = 0$
$H_1 :$ at least $\alpha_{2i} \neq 0$, i =1,……, n

If H_0 is rejected, *Yt Xt* is understood to be a Granger cause from equation *(6).*

$H_0 : b_{21} = b_{22} = \ldots\ldots b_{2n} = 0$ rejected
$H_1 :$ at least $b_{2i} \neq 0$, i =1……,r

If H_0 is rejected, *Xt Yt* is understood to be a Granger cause from equation *(7).*

V. ANALYSIS RESULTS

Unit Root Test Results

Table 3 Panel Unit Root Test Results

	GDP					
	Level			1st difference		
	Individual intercept	Individual intercept and trend	None	Individual intercept	Individual intercept and trend	None
Levin, Lin & Chu t*	4.21 (1)	0.58 (0.75)	3.85 (0.99)	-4.17* (0.00)	-3.51* (0.00)	-6.21* (0.00)
Im, Pesaran, and Shin W-stat	5.26 (1)	2.44 (0.99)	__	-4.74* (0.00)	-5.13* (0.00)	__
ADF - FisherChi-square	0.42 (1)	3 (0.98)	0.51 (1)	41.68* (0.00)	42.92* (0.00)	51.24* (0.00)
PP - FisherChi-square	0.08 (1)	1.12 (0.99)	0.04 (1)	56.02* (0.00)	49.19* (0.00)	72.4* (0.00)
	CURRENT ACCOUNT DEFICIT					
Levin, Lin &Chu t*	2.94 (0.99)	1.87 (0.96)	-1.19 (0.11)	-2.33* (0.00)	0.37* (0.64)	-9.21* (0.00)
Im, Pesaran, and Shin W-stat	0.73 (0.76)	0.68 (0.75)	__	-7.44* (0.00)	-7.46* (0.00)	__
ADF - FisherChi-square	9.31 (0.5)	10.68 (0.38)	17.72 (0.05)	71.72* (0.00)	72.66* (0.00)	102.96* (0.00)
PP - FisherChi-square	8.24 (0.6)	12.16 (0.27)	15.05 (0.13)	99.26* (0.00)	550.56* (0.00)	194.89* (0.00)
	OILPRICE					
Levin, Lin &Chu t*	4.94 (1)	-1.33 (0.09)	3.07 (0.99)	-4.99* (0.00)	-6.14* (0.00)	-10.33* (0.00)
Im, Pesaran, and Shin W-stat	5.27 (1)	2.8 (0.99)	__	-8.43* (0.00)	-12.5* (0.00)	__
ADF - FisherChi-square	0.11 (1)	0.91 (0.99)	0.46 (1)	79.41* (0.00)	114.93* (0.00)	101.56* (0.00)
PP - FisherChi-square	0.19 (1)	0.87 (0.99)	0.87 (0.99)	116.31* (0.00)	131.95* (0.00)	152.56* (0.00)

When looking at the results of the unit root test in Table 3, all variables were not stable in accordance with their level, yet the level of their first differences was seen to be stable. Therefore, the level of first differences for the series was used in panel data analysis.

Panel Data Analysis Results

Two models have been established in this study. Model 1 examines the impact of oil prices on GDP. Model 2 examines the impact of oil prices on the current account deficit.

Table 4 Panel Data Analysis for Model 1

Dependent Variable: D (GDP)				
Method: Panel EGLS (Cross-section random effects)				
Sample (adjusted): 1981-2013				
Periods included: 33				
Cross-sections included: 5				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26511.61	10287.78	2.577000	0.0109
D (OILPRICE)	3335.795	530.4054	6.289142	0.0000
Effects Specification			S.D.	Rho
Cross-section random			18672.38	0.0573
Idiosyncratic random			75747.62	0.9427
	Weighted Statistics			
R-squared	0.195274	Mean dependent var		19481.43
Adjusted R-squared	0.190337	S.D. dependent var		84181.52
S.E. of regression	75747.62	Sum squared resid		9.35E+11
F-statistic	39.55330	Durbin-Watson stat		1.520233
Prob (F-statistic)	0.000000			

Table 5 Hausman Test for Model 1

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	1	1.0000

Table 6 Panel Data Analysis for Model 2

Dependent Variable: D (CURRENT DEFICIT)				
Method: Panel EGLS (Cross-section random effects)				
Sample (adjusted): 1981-2013 Periods included: 33				
Cross-sections included: 5				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.600214	0.744956	-0.805703	0.4216
D (OIL PRICE)	-0.324543	0.065757	-4.935474	0.0000
	Effects Specification			
			S.D.	Rho
Cross-sectionrandom			0.000000	0.0000
Idiosyncraticrandom			9.390851	1.0000
	Weighted Statistics			
R-squared	0.132433	Meandependent var		-1.306636
Adjusted R-squared	0.127111	S.D. dependent var		9.945205
S.E. of regression	9.291661	Sum squared resid		14072.60
F-statistic	24.88175	Durbin-Watson stat		1.945721
Prob (F-statistic)	0.000002			

Table 7 Hausman Test for Model 2

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-sectionrandom	0.000000	1	1.0000

While performing panel regression analysis, the model was analyzed using the Hausman test to see whether it had fixed effects or random effects. When looking at the results of the Hausmen Test which are given in Tables 5 and 7, as the probability value for both of the models was not less than the significance level, the hypothesis for the appropriateness of the random effects model, which therefore tests the null hypothesis of the Hausman test, was shown to be acceptable.

When considering the results of the panel data analysis that are in Tables 4 and 6, the coefficient of oil price appears to be significant as a statistical model based on both the variables of GDP and the current account deficit. The value of R^2 for Model 1 was seen to be 0.19, and the R^2 value for Model 2 was seen as 0.13. These results express that oil prices explain 19% of the GDP variable for each one of these countries and 13% of their current fiscal deficit. Also for both models, the regression analysis of the Prob values (F-statistic) being less than 0.05 as a level of significance implied that they are collectively significant. In addition, the DW statistic with a value close to 2 shows that there is not an autocorrelation problem in the model. The assumption of normality, the other assumption of regression analysis, was tested using the Jarque-Bera test and was found to be maintained.

The findings obtained from the results of analysis showed that while a statistically positive correlation exists between GDP and petrol prices, there is a negative correlation with the current account deficit. Accordingly, as gas prices increased so did the GDP. Because oil is an important input used in production, the growth that has been experienced in production has increased the demand for oil and raised its price. In addition, the economic growth that has brought a more prosperous lifestyle and been imparted to society increases consumers' level of luxury and oil consumption. The direction of the mentioned relationship between current account deficit and oil prices varies according to whether the country is an importer or exporter of oil (Bildirici & Kayıkçı, 2012, p. 92). Data has shown a positive relationship to be found between oil prices and current account deficit when there is a high degree of oil dependency and a negative relationship when this dependency is not shown to be high. Accordingly, when considering the degree of oil dependency from the countries that have been discussed, the obtained result is significant for Brazil and Indonesia, whose dependence is not high. However, this result is contrary to what is expected for India, South Africa, and Turkey, whose degree of oil dependence is high. In this context, other factors must be taken into account, such as the structure of the current account deficit, their method of deficit financing, exchange-rate policies, macro-economic situation, and global economic climate. An important determinant of the current account deficit is also the foreign trade account. A study performed on India expressed a significant relationship between oil prices and foreign trade accounts that had bidirectional causality. According to this, while oil prices had a negative effect on the balance of foreign trade,

the balance of foreign trade had a positive effect on oil prices (Tiwari, Arouri, & Teulon, 2014, p. 16). In studies in the literature on this subject, oil prices were stated to not be dependent on other factors that are considered to impact current account deficit (Huntington, 2015; Özata, 2014).

The Results of Panel Data Analysis Sorted by Country

Through panel data analysis, after the relationship between GDP and oil prices (Model 1) and between the current account deficit and oil prices (Model 2) were tested as a collective panel for the countries of the Fragile Five, country decomposition analysis was performed to examine the individual case of every country. The variables of oil price changes are given in Table 8 for the Fragile-Five countries for Models 1 and 2.

Table 8 Country Decomposition Analysis Results

Countries	Model 1	Model 2
Brazil	19,868.51	-0.762091
India	11,745.70	0.409727
Indonesia	-6,683.205	0.336970
South Africa	-17,070.34	0.588152
Turkey	-7,860.663	-0.572758

When looking at the results in Table 6 for Brazil, oil prices are seen to have a negative relationship with the current account deficit and a positive relationship with the GDP. Oil prices for Indonesia and South Africa, however, have the opposite effect on GDP but the same effect on the current account deficit. The oil price factor for India is realized positively for both models, and for Turkey it is realized as a negative factor for both models. In the general literature on the effect of oil prices on GDP, the actions of net exporting countries that are experienced in oil prices cause different effects for net importing countries. According to this, while the extra revenue that is obtained with the increase in oil prices increases the GDP for net exporting countries, net importing countries handle this situation oppositely. Of the countries that were subjected to analysis, Turkey, South Africa, and India are net importers. Of these countries, Turkey and South Africa's negative relationship between GDP and oil prices is consistent with the literature. As can also be understood from Table 2, Brazil is a country where almost all of its oil needs can be met with its own resources. Therefore, the impact of its oscillating oil prices remains weak on its GDP. In Indonesia, the situation is somewhat different. While Indonesia had been positioned as a net exporter until 2004, it is situated as a net importer due to the increase that was experienced in domestic demand as well as the decline in production in the domestic market (Mulyadi, 2012, p. 32). During the period that was analyzed from the many years Indonesia was positioned as a net exporter, the positive correlation of oil prices on GDP is consistent with the literature. The case for India, however, suggests the opposite theory. India is a country with the second highest population density in the world. Because it is an economy continuing its process of industrialization, the economic activities of the industrial sector are more commonly based on the agricultural and service sectors in the country as it develops (Ghalayini, 2011, p. 136). For this reason, industrial growth is not predominantly dependent on a structure of manufacture. These special conditions are less affected from fluctuations in India's oil prices than other countries; it shows economic growth that is not energy focused. Furthermore, India has achieved an economic growth of 6.7% between 1990 and 2011. The energy demand has also increased together with the long-term, high growth rate that was achieved with the living standards that emerged in the country (Hassanpour, 2013, p. 887). These two cases mentioned above may explain trends in the same direction with GDP and oil prices, especially in India. However, from the different situations that were experienced in the countries subjected to comparison, that the direction of the relationship between GDP and fluctuating oil prices is not clear can be stated as not always complying with the general literature. This also can be associated with the internal dynamics of a country's economy.

The effect of a commodity that is a subject of trade on the current account deficit of any country varies according to if that country is an exporter or an importer of that commodity. If country X is an exporter of commodity Y, the income obtained from that commodity is entered as a profit to the current account balance of country X. Conversely, the fee that is paid for the commodity is referred to as a loss to the current account

balance. If the price of commodity Y increases or decreases, it respectively becomes a gain or a loss for the exporting country. This then becomes a loss or a gain respectively for the importing country. Oil, like other commodities, is a commercial product. The effect of fluctuations experienced in oil prices on current account transactions still largely varies according to whether that country is an exporter or an importer. India, South Africa, and Turkey are countries that are net importers. Brazil and Indonesia as oil exporters are countries who can also meet a significant portion of the domestic market. Considering the data from India, South Africa, and Indonesia, their relationship between the current account balance and oil prices is consistent with those reported in the literature. The results coming out of Turkey and Brazil, on the other hand, show differences with the theory. Internal dynamics such as the nature of their current account, these countries' terms of financial liability, and their structure of industrialization can be counted among these reasons.

Results of the Panel Cointegration Test

When determining whether or not the variables of GDP and current account deficit could be cointegrated bilaterally with the variable of oil price as dealt with in the study, the Kao residual cointegration test from the panel cointegration tests was performed and the results are given in Tables 9 and 10.

Table 9 GDP and Oil Price Cointegration Test

Kao Residual Cointegration Test		
Series: OILPRICE GDP		
Sample: 1980-2013		
Included observations: 170		
Null Hypothesis: No co-integration		
Trend assumption: No deterministic trend		
Newey-West automatic band width selection and Bartlett kernel		
	t-Statistic	Prob.
ADF	0.517926	0.3023
Residual variance	100.4535	
HAC variance	67.45929	

When looking at Table 9, the variables of GDP and oil prices were determined to not be cointegrated; in other words, they don't act consistently together over the long-term. These two variables, even though they do interact together, could not be determined to have a long-term econometrically stable relation because their sequences are extremely volatile in accordance with their own internal dynamics. Although there is a relationship between oil prices and GDP, there are also other macro-economic factors that affect GDP. This situation undermines the existence of a stable relationship between these two variables. In studies conducted on this subject, the results of the relationship between these two variables vary. In a study that was made on Gambia, Ghana, and Nigeria, oil prices on inflation and the budget deficit were examined. According to this, oil prices in Gambia were stated to have a low degree of positive co-integration with the budget deficit and a negative cointegration with inflation. In Ghana, oil prices, the budget deficit, and inflation had a low level of positive cointegration; in Nigeria, cointegration was high and in the opposite direction (WAMA, 2008). A study examining the relationship of oil prices and some macroeconomic variables in ASEAN and South Asian countries was performed by Chang et al. (2011). According to this, oil prices and GDP were found to be cointegrated in Australia, Japan, South Korea, and Thailand (Chang, Jha, Fernandez, & Jam'an, 2011, p. 17). Rautava (Rautava, 2004, p. 326) determined in his study that the variables of oil prices and GDP in Russia had long-term cointegration. Asaolu and Ilo (Asaolu & Ilo, 2012) found in their analyses of Nigeria, which covered the years 1984-2007, that there was a long-term relationship between oil prices and GDP. In the analysis performed by Balcılar et al. (Balcilar, Eyden, Uwilingiye, & Gupta, 2015), oil prices and GDP were found to not have a long-term cointegration.

Table 10 Cointegration Test for Current Account Deficit and Oil Price

Kao Residual Cointegration Test		
Series: CURRENT DEFICIT OIL PRICE		
Date: 09/03/15 Time: 13:47		
Sample: 1980-2013		
Included observations: 170		
Null Hypothesis: No cointegration		
Trend assumption: No deterministic trend		
User-specified lag length: 1		
Newey-West automatic band width selection and Bartlett kernel		
	t-Statistic	Prob.
ADF	-1.354678	0.0878
Residual variance	85.63544	
HAC variance	58.73862	

In examining the results of Table 10, the variables of oil prices and current account deficit were found to be cointegrated and to act together long term. The current account deficit was determined as the one variable that was more affected by the price of oil compared GDP, especially for countries dependent on oil imports, and the relationship between these two variables was long-term, stable, and econometric. There are only a limited number of studies in the literature that examines the relationship between oil prices and current account deficit. In a study conducted on Turkey, these two variables were determined to be long-term and positively related (Mucuk et al., 2013, p. 27). In another study, the import and export of oil was indicated as having a strong relationship with India's current account balance (Tiwari, 2012). In oil consumption, a dependence on imports was the most important factor that determined the effect of oil prices on the current account deficit. When oil prices increase/decrease, the current account liabilities of a net importer country's economy increase/decrease. This phenomenon is different for net exporting countries. When oil prices increase/decrease, the receivables of an exporting country's current account balance increase/decrease.

Panel Causality Test Results

In the current study, a panel causality analysis was made between oil prices and GDP, and the results are shown in Table 11.

Table 11 GDP and Oil Price causality test

Pairwise Granger Causality Tests			
Date: 09/03/15 Time: 14:49			
Sample: 1980-2013			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
OILPRICE does not Granger Cause GDP	160	14.1651	0,00
GDP does not Granger Cause OILPRICE		13.0572	0,00

Referring to Table 11, a bilateral causal relationship can be seen between GDP and oil prices. Accordingly, while oil prices affect GDP, GDP may also affect oil prices. A bidirectional relationship is seen between oil prices and economic activity. While fluctuations experienced in oil prices affect the amount of economic activity, increases or decreases in economic activity can also cause fluctuations in oil prices (Şahin & Kaya, 2014, p. 190). An increase or decrease that is experienced in oil costs will respectively increase or decrease countries' production costs. In this case, a decrease or increase in the final output may occur. Aside from this, oil demand that increases or decreases together with an overall demand that increases or decreases during a period of economic instability could be the cause for the increase or decrease in oil prices. According to the results of a

study made on numerous countries about oil exporters and importers, no causality was found towards GDP from oil prices; in Iraq, Quwait, China, Luxemborg, Belgium, France, Spain, and the United States, however, a causality has been identified from oil prices towards GDP (Lescaroux & Mignon, 2008).

Table 12 Current Account Deficit and Oil Price Causality Test

Pairwise Granger Causality Tests			
Date: 09/03/15 Time: 14:51			
Sample: 1980-2013			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
CURRENTDEFICIT doesn't Granger Cause OILPRICE	160	1.15414	0.3180
OILPRICE doesn't Granger Cause CURRENTDEFICIT		8.09616	0.0005

When looking at Table 12, the current account deficit did not affect oil prices; in contrast, oil prices were seen to affect the current account deficit. While a fluctuation in oil prices affects the current account balance, it may cause either an increase or a decrease in the current account deficit (Morsy, 2009, p. 11). However, an increase or decrease in the current account deficit cannot be said to clearly affect the behavior of oil prices. As is known, the current account balance is one of the sub-items of the foreign trade account. The net exports of countries in the foreign trade account provide that country's external trade balance. Because oil is also a tradable commodity, an increase in oil prices can affect the foreign trade account, thus affecting the current account balance, too. Yet an increase in the current account deficit does not have a significant impact on oil prices. Among the reasons that affect oil prices are the effect of factors such as geopolitical conditions, the amount of supply and demand, the discovery of new reserves, newly found forms of energy that could be substituted for oil, and so on. However, studies are also found in the literature that state the current account deficit has been found to affect oil prices (Bildirici, Alp, & Bakirtas, 2010; Tiwari et al., 2014).

VI. CONCLUSION

Macroeconomic performance is important for sustainable growth and economic stability. In this sense, the course of oil prices is very important because oil is used as a basic input in many sectors and it influences the price structure of the economy. In this study, the effect of oil prices on growth and current account deficits was identified for Brazil, Indonesia, South Africa, India, and Turkey, or the Fragile Five, in an environment of ample liquidity that had been revealed after the economic crisis of 2008, especially in terms of current account deficits and exchange rates. Although there are many studies in the literature on the movement of oil prices, there is need for new analyses in developing countries whose vulnerabilities have increased during the post-crisis period. A growth in the volatility of oil prices has increased the need for these studies.

In this context, annual data covering the years 1980-2014 for the Fragile-Five countries has been subjected to panel data analysis. Firstly, a statistically significant relationship between economic growth, oil prices, and current account deficit was found in the Fragile Five at the end of the analysis. According to the results, oil prices explain 19% of the GDP and 13% of the current account deficit alone. Secondly, according to the results of the panel data analysis, a positive correlation between GDP and oil prices as well as a negative correlation between oil prices and the current account deficit was found for the Fragile Five. Accordingly, an increase in oil prices leads to an increase in GDP. The relationship between oil prices and current account deficit varies depending on whether the country is an oil exporter or importer. An increase in oil prices does not positively affect the current account deficit for an oil exporting country, but an increase in oil prices negatively affects the current account deficit for an oil importing country. In this regard, there is a harmony between the conclusions from the literature for Indonesia and Brazil, who have little or no dependency on imports for their oil supply. However, this is contrary what was expected for India, South Africa, and Turkey, who have a high dependence on oil. In this context, other factors such as the structure of the current account deficit, the method of financing this deficit, exchange rate policies, and macro-economic and global economic situations must be taken into account. Thirdly, when performing the country decomposition analysis, oil prices were concluded to positively be correlated with GDP and negatively correlated with the current account deficit in Brazil; while the opposite situation was seen in South Africa and Indonesia, oil prices were positively correlated with the variables of GDP and current account deficit in India; in Turkey, there was a negative correlation. Fourthly, when considering the long-term relationship of oil prices with the other two variables, oil prices did not have a long-term relationship with GDP but a long-term relationship was shown with current account deficit. In the causality

tests which determined the direction of the relationship among the examined variables, a bi-directional causality between GDP and oil prices and a unidirectional causality from current account deficit to oil prices were determined.

When considering the impact of oil price movements on both economic activity and current account deficit, special attention should be given to the recommendation for determining energy policy. Net importing countries such as Turkey, South Africa, and India should diversify their energy sources; increasing their renewable energy sources in particular and the use of nuclear energy are strongly recommended. Reliance on a single energy source increases the effects of shock. On the other hand, when one considers the growing demand in Indonesia and Brazil which appears less fragile in terms of oil, they should rapidly pass structural reforms implemented to ensure more effective operation of the energy market. No doubt, reforms such as reducing price controls, a gradual reduction of subsidies, renovation of the infrastructure, and increasing energy efficiency should be on the agenda of all Fragile-Five countries.

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